

U.S. Application Serial No.: 10/501,625
Amendment dated October 11, 2005
In response to Office Action dated June 9, 2005

REMARKS

Claims 1-13 and 23-30 are in this application.

Claims 14-22 have been canceled. Applicants have canceled the non-elected claims 21 and 22 without prejudice or disclaimer.

Claim 1 has been amended. The product and composition claims have been amended to mirror the changes in claim 1.

Support for amended claim 1 is found on page 4, line 6, of the published text of the application along with the discussion bridging pages 2 and 3 thereof.

New claims 23-30 have been added.

New claim 23 corresponds exactly to the preferred embodiment disclosed on page 7 of the published text of the application. Support for the newly presented claims is in the canceled claims 14-22 and throughout the application.

Applicants affirm the provisional election made on May 31, 2005 to elect the claims of Group I for further prosecution.

Request for a one-month extension of time is hereby made to extend the period for response to October 11, 2005.

The claims have been rejected as follows:

(1) Claims 1-4, 7, 8, 14 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Dekmezian et al. (U.S. Patent No. 6,734,265), herein after "Dekmezian;"

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(2) Claims 1-3, 10-12 and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Beerwart (U.S. Patent No. 5,814,413), herein after "Beerwart;"

(3) Claims 5, 6, 9-11 and 16-20 are rejected under 35 U.S.C. 103(a) as being obvious over Dekmezian;

(4) Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being obvious over Dekmezian in view of Falla et al. (U.S. Patent Publication No. 20020006482), herein after "Falla;" or

(5) Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being obvious over Beerwart in view of Falla.

Applicants have amended claim 1 to define:

"A film of a multimodal polyethylene produced by polymerization catalysed by a single site catalyst having more than one η^5 -cyclic ligand said multimodal polyethylene comprising

- ai) a lower molecular weight homopolymer of ethylene and
- bi) a higher molecular weight terpolymer of ethylene and two comonomers selected from C₄ to C₁₂ alpha-olefins,

or

- aii) a lower molecular weight polymer which is a binary copolymer of ethylene and a comonomer selected from C₄ to C₁₂ alpha-olefin and
- bii) a higher molecular weight polymer which is either a binary copolymer of ethylene and a C₄ to C₁₂ alpha-olefin comonomer different from the comonomer employed in aii) or a terpolymer with two comonomers selected from C₄ to C₁₂ alpha-olefins;

or

- aiii) a lower molecular weight terpolymer of ethylene and two comonomers selected from C₄ to C₁₂ alpha-olefins,
- biij) a higher molecular weight terpolymer of ethylene and two comonomers selected from C₄ to C₁₂ alpha-olefins;

wherein all components are made by the same catalyst."

Claim 1 defines a film of a multimodal polyethylene in which the components are different but are made by the same catalyst. Support for the amendment of

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claim 1 is found on page 4, line 6, of the published text of this application along with the discussion bridging pages 2 and 3 thereof.

Claim 23 is new and corresponds exactly to the preferred embodiment disclosed on page 7 of the text. The product and composition claims have been amended to mirror the changes in claim 1.

Dekmezian describes a film which comprises a terpolymer component. This possibility is mentioned in column 4, line 46. However, Applicants point out that Dekmezian teaches the formation of his polyethylene composition using a dual site catalyst.

A dual site catalyst is a catalyst in which two different active polymerisation catalysts are present at the same time in the reaction vessel. In contrast, instant claim 1 is limited to a single site catalyst, which corresponds to the situation where the same metallocene catalyst is used to form all components in the mix. Such a result cannot be achieved using a dual site catalyst. The claims are therefore novel over Dekmezian.

Beerwart describes a multilayer protective garment film that has two components. However, it is explicitly stated in Beerwart that the second component should be prepared using a different metallocene catalyst than the first component. Nowhere is it taught that the same catalyst should or could be employed for all components. Claim 1 is therefore novel over Beerwart.

The present invention defines a multimodal film composition explicitly designed for its superior sealing properties. Sealing is obviously an important feature of a polyethylene film since it allows the film to be used in food and medical

packaging applications where the seal is important to ensure that the packaged product is kept fresh and protected during transport.

Figure 1 shows that the polymers of the invention have superior hot tack to conventional films. The comparative examples show that our films are better in terms of hot tack than LDPE films, bimodal Ziegler Natta LLDPE films and monomodal Ziegler Natta LLDPE films.

Beerwart makes protective garments from his films. These are for use in the medical and meat processing industries. The heat sealing properties of such films are therefore entirely irrelevant.

Beerwart does not teach or suggest the improved heat sealing properties that can be achieved using the films of the present invention.

Moreover, Beerwart explicitly teaches the use of different metallocenes to make his films. This means that two different metallocens have to be manufactured and separate polymerisation reactions used to form the polymers, which are then blended to form a mix that can be used to form the films described in Beerwart. Thus, Beerwart does not contemplate the use of the same catalyst to make the components of his films.

By using the same metallocene, films of the present invention can be manufactured in a multistage polymerisation where, for example, the low molecular weight component can be produced in a first loop reactor and the material transferred to a gas phase reactor for the formation of the high molecular weight component. The resulting films are particularly homogeneous as the "blending" process occurs in situ in the second reactor and only one metallocene need be

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manufactured. This is clearly advantageous over a system where two metallocenes, two separate polymerisations and a blending step are required.

Dekmezian describes a new LLDPE composition which is made using a dual site catalyst. While the LLDPE may be bimodal, its formation requires the use of two different catalysts and is much trickier in terms of chemistry than the use of a single metallocene and multistage polymerisation.

For example, Dekmezian must consider the problems of the catalysts interacting with each other and perhaps killing each other and has to consider the possibility of one component not performing as well as the other. Thus, it is impossible to optimise polymerisation conditions for all catalysts simultaneously. This problem would be particularly acute in multimodal systems.

Moreover, the supporting of both catalysts on the same support as suggested in column 2 of Dekmezian is cumbersome. Dekmezian does not teach or suggest that advantageous polymer films could be obtained if both polymers were made using the same catalyst. Naturally, this problem would be more difficult to solve, if at all, in multimodal systems.

Applicants also point out that that Dekmezian's aims to provide a high melt-strength and high melt-index rather than to improve sealing.

The Dekmezian process is also limited in terms of the polymerisation components it can produce. It can either produce two copolymer components or two terpolymer components. What it cannot do is produce components such as a homopolymer and a terpolymer or two copolymers comprising different comonomers. The present invention specifically covers combinations such as this. Thus, the instant claims are inventive over Dekmezian.

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Falla is relied upon purely to argue that the blow up ratio of the films claimed in claim 13 of the instant application is not itself inventive. While we agree that the blow up ratio in and of itself may not be a patentable feature, claim 13 is patentable by virtue of its dependence from claim 1. Accordingly, no further comments on Falla are necessary.

In view of the foregoing, all pending claims are allowable. Applicants believe that the claims are in condition for allowance. Accordingly, the rejection of: (1) claims 1-4, 7, 8, 14 and 15 under 35 U.S.C. 102(e) as being anticipated by Dekmezian et al.; (2) claims 1-3, 10-12 and 14-17 under 35 U.S.C. 102(b) as being anticipated by Beerwart; (3) claims 5, 6, 9-11 and 16-20 under 35 U.S.C. 103(a) as being obvious over Dekmezian; (4) claims 12 and 13 under 35 U.S.C. 103(a) as being obvious over Dekmezian in view of Falla; and (5) claims 12 and 13 under 35 U.S.C. 103(a) as being obvious over Beerwart in view of Falla should be withdrawn and claims 1-13 and the newly presented claims 23-30 should be allowed.

Reconsideration and allowance of this application is respectfully requested.

Respectfully submitted,

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By:

V. Alexanian

Vazken A. Alexanian
Registration No. 37,270
Agent for Applicants
Ohlandt, Greeley, Ruggiero
& Perle, L.L.P.
One Landmark Square, 10th Floor
Stamford, CT 06901-2682
Tel: (203) 327-4500
Fax: (203) 327-6401